

## CLAIMS

### What is claimed is:

1. A method of controlling the flow of resin, the method comprising:
  - illuminating one or more resin exclusion regions on a substrate;
  - applying a photo-polymerizable resin to one or more dark regions of the substrate, whereon the resin flows; and,
  - polymerizing the resin at one or more illumination interface between the resin exclusion regions and the dark regions, thereby forming one or more barriers;
  - whereby the resin flows onto one or more dark regions, and is substantially restricted from flowing onto the resin exclusion regions of the substrate.
2. The method of claim 1, wherein illuminating comprises directing laser light onto the substrate.
3. The method of claim 1, wherein illuminating comprises directing light onto the substrate through transparent portions or around edges of a mask.
4. The method of claim 1, wherein illuminating comprises directing light onto the substrate by reflection or refraction from a surface.
5. The method of claim 3, wherein the light comprises UV light.
6. The method of claim 3, wherein the mask comprises a microfluidic reagent well caddie, a semiconductor chip, a reflective/refractive surface, or cladding on an optic fiber.
7. The method of claim 1, wherein the resin exclusion region comprises an end of a optic fiber or capillary tube.
8. The method of claim 1, wherein the substrate comprises a microfluidic chip or a semiconductor pad.
9. The method of claim 1, wherein the resin flow comprises capillary action.
10. The method of claim 1, further comprising conducting electricity through the resin.
11. The method of claim 1, further comprising final curing the resin with light or heat.
12. The method of claim 11, wherein the substrate comprises quartz glass.
13. A resin flow control system comprising:
  - a mask positioned between a substrate and a light source, whereby one or more illuminated regions and one or more dark regions are defined on a surface of the substrate; and,

a photo-polymerizable resin on the substrate surface in one or more dark regions; whereby the resin can flow on the substrate surface of the dark regions and is substantially excluded from the substrate surface of the illuminated regions.

14. The system of claim 13, wherein the mask comprises a microfluidic reagent well caddie.
15. The system of claim 13, wherein the mask comprises a semiconductor chip.
16. The system of claim 13, wherein the mask comprises substantially opaque cladding on an optic fiber or capillary tube.
17. The system of claim 13, wherein the mask comprises a reflective/refractive surface.
18. The system of claim 13, wherein the substrate comprises a microfluidic chip.
19. The system of claim 13, wherein the illuminated regions comprise one or more optic fiber ends or one or more capillary tube ends.
20. The system of claim 13, wherein the substrate is positioned in a horizontal orientation and illumination is from below the substrate.
21. The system of claim 13, wherein the light source comprises a UV lamp.
22. The system of claim 13, wherein an intensity of the illumination is adjustable by changing a path length between the light source and the substrate, changing a diameter of a mechanical aperture in the light path, or changing a power supplied to the light source.
23. The system of claim 13, further comprising one or more shutter between the light source and the substrate.
24. The system of claim 13, further comprising one or more mirror reflecting light between the light source and the substrate.
25. The system of claim 24, wherein the mirror does not substantially reflect infrared light.
26. The system of claim 13, wherein the resin comprises one or more heat sensitive initiators.
27. The system of claim 13, wherein the resin is in contact with both the substrate and the mask.
28. The system of claim 3, wherein at least one of the transparent portions is a perforation.